

Performance of an Active Watering System for Veggie

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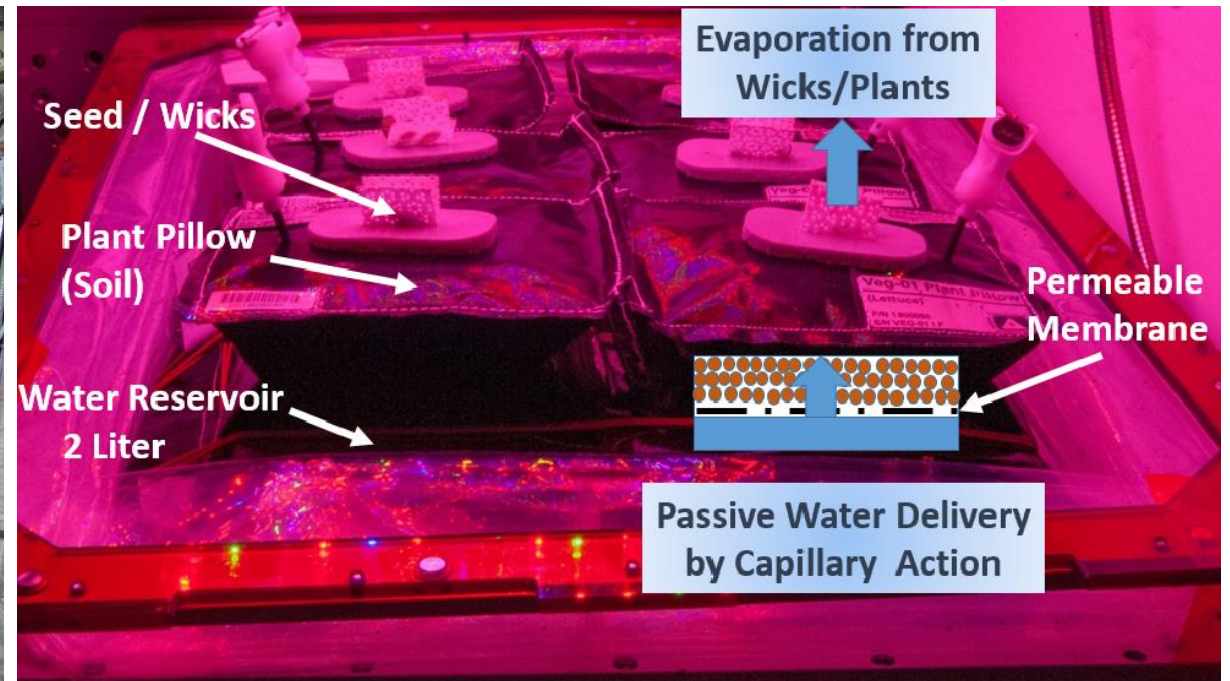
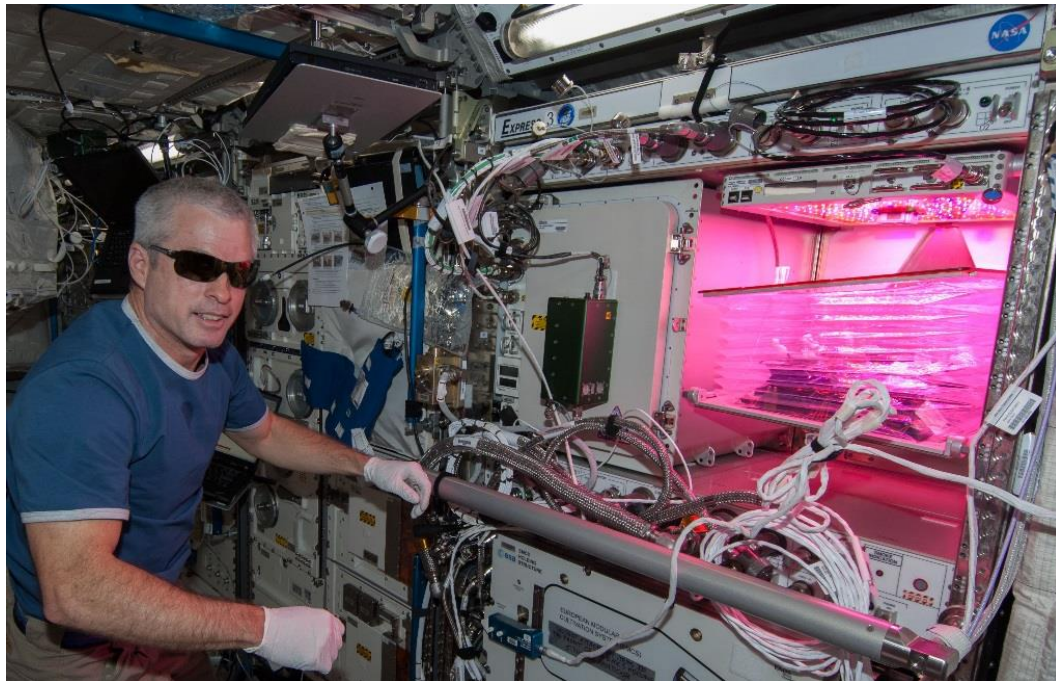
Air Revitalization Lab

Kennedy Space Center, FL 32899

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Veggie – Experimental system

- Platform for food production experiments - 0.25 m²
- Uses a Passive Watering system



Food Production

- Large Scale – Scale from Experimental to Production
 - 50 g salad per day for Crew = 6
 - 1 m² Planting area
- Performance criteria:
 - Productivity – maximal
 - Consistency – repeatable
 - Crew Time - minimal

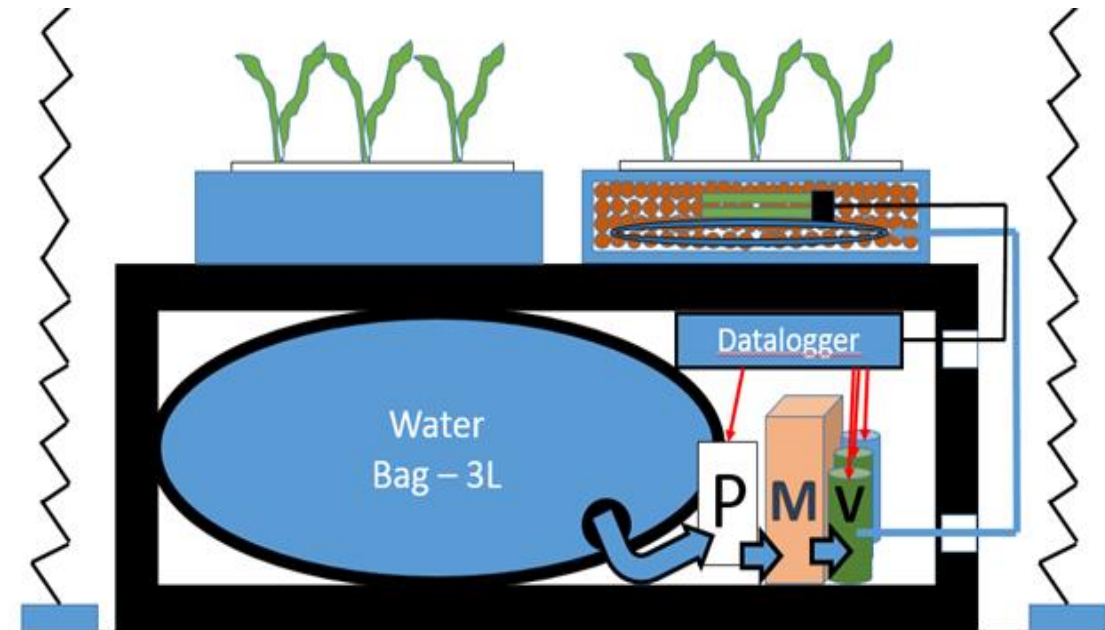
Veggie - Performance

- Productivity
 - Not optimal
 - Edible
- Inconsistent
 - Hard to control delivery rates in 0 g
 - Uneven germination – water stress
- Crew Time
 - Hand watering

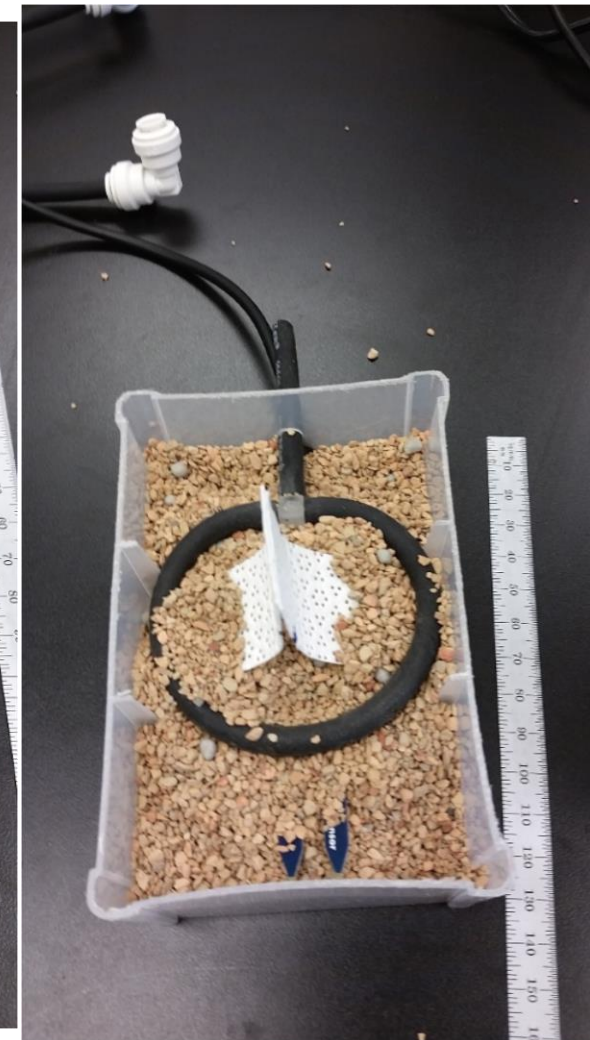
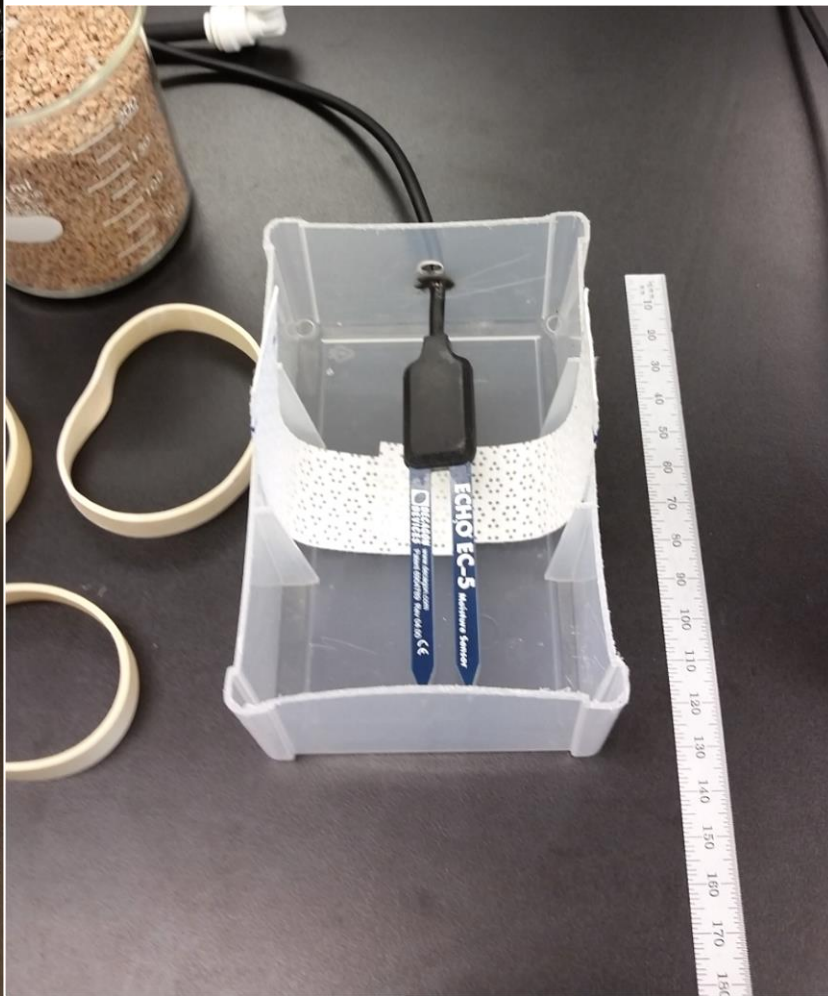
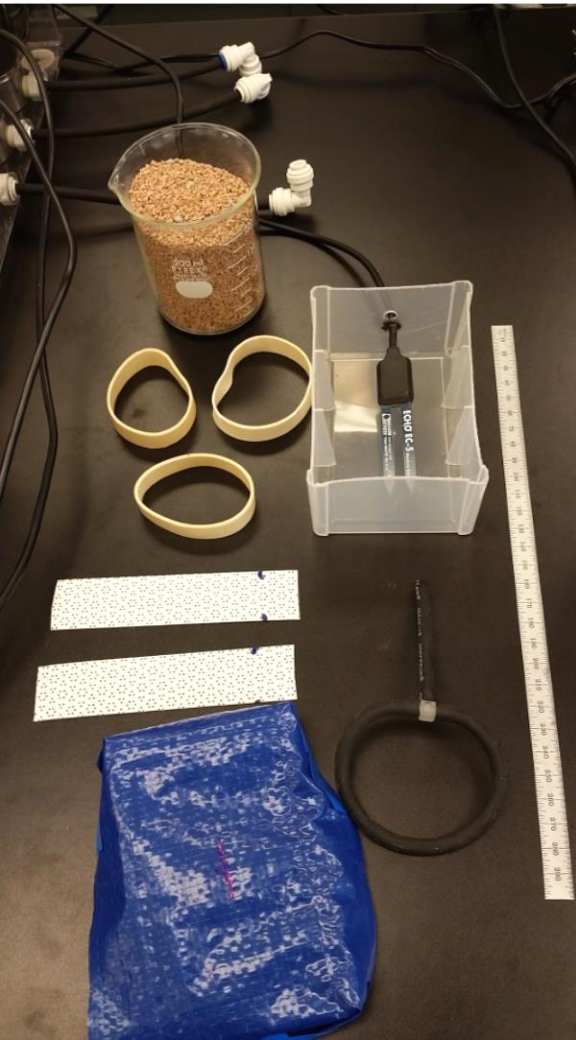


Active Watering System for Veggie

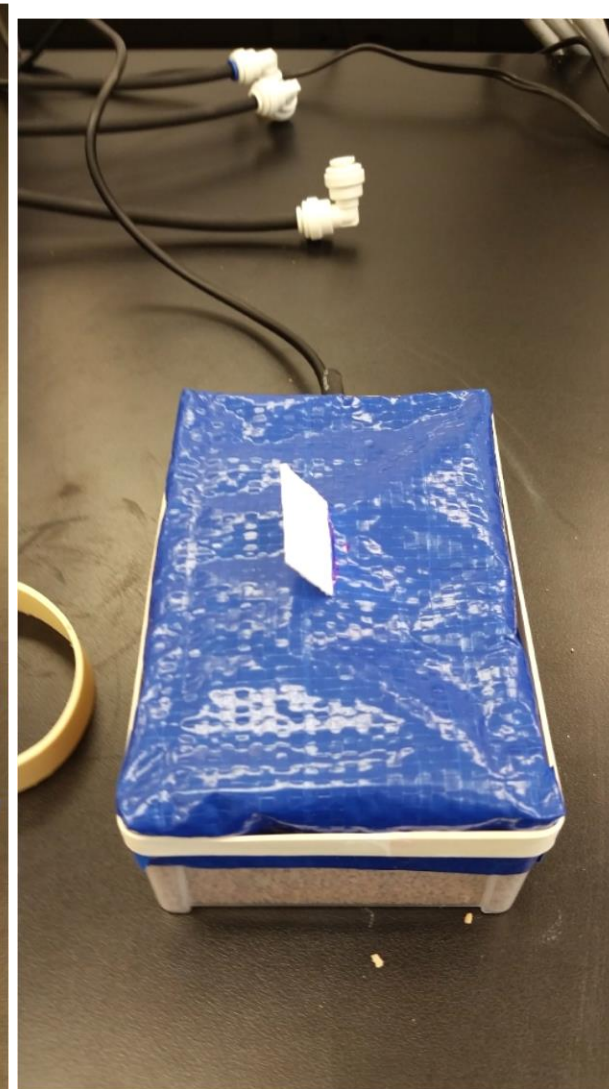
- Uses power – 10 W
- Automated operation - Water on-demand
- Additional resources – Laptop , sensors, pumps
- How robust is the system?
- Can it be scaled?



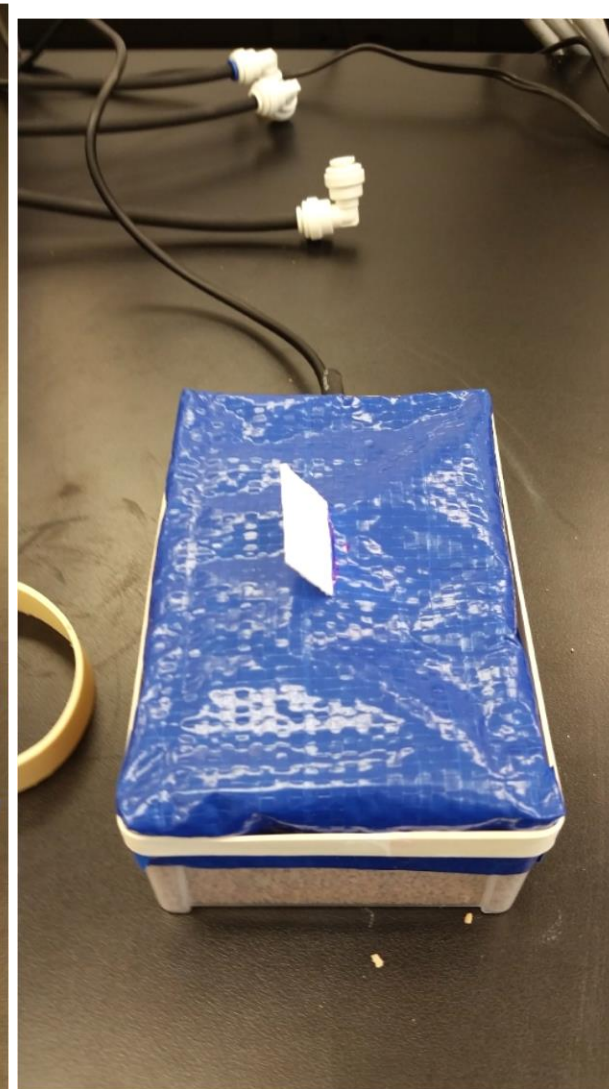
Pillow Assembly



Pillow Assembly



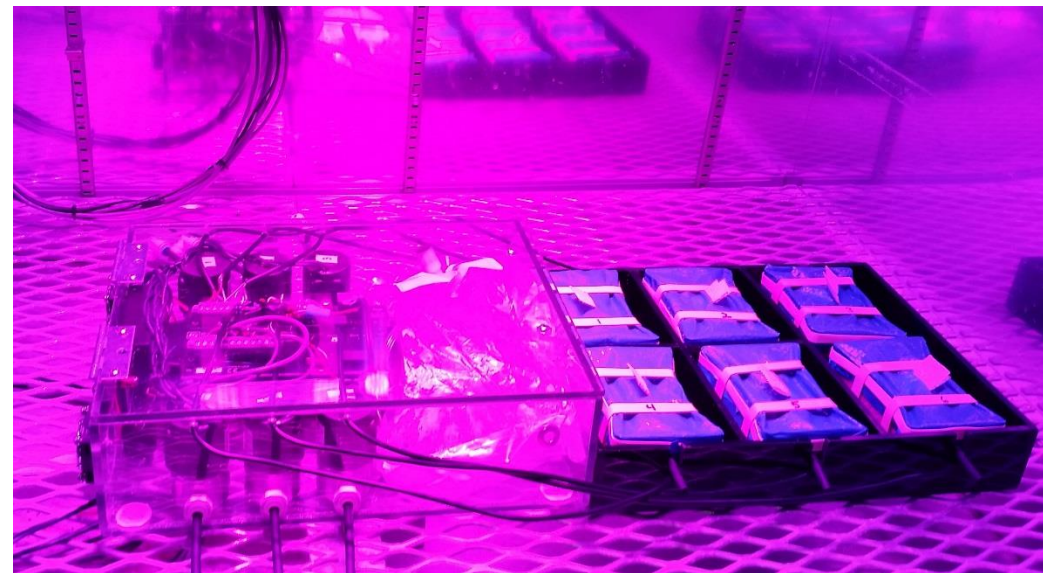
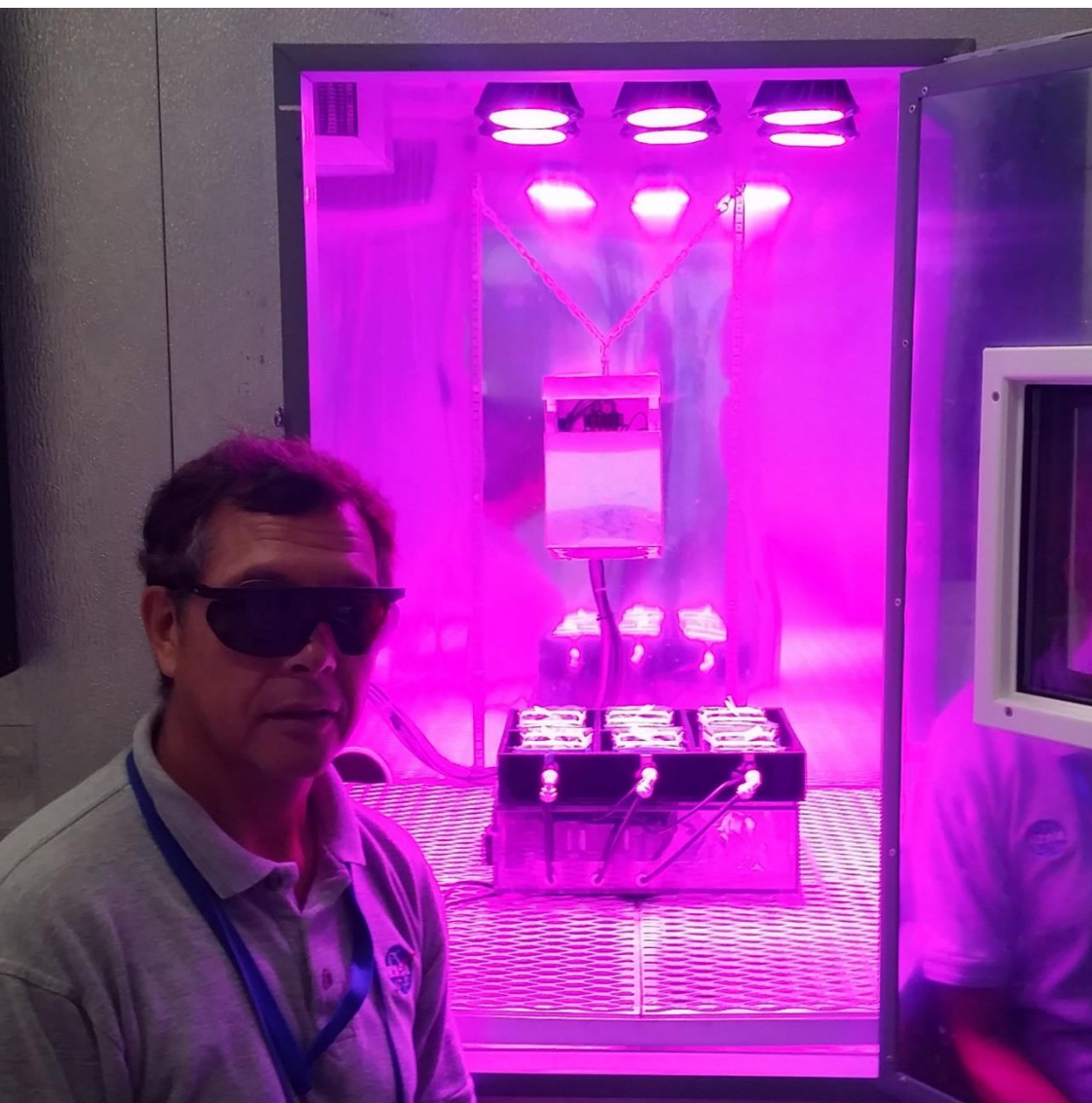
Pillow Assembly



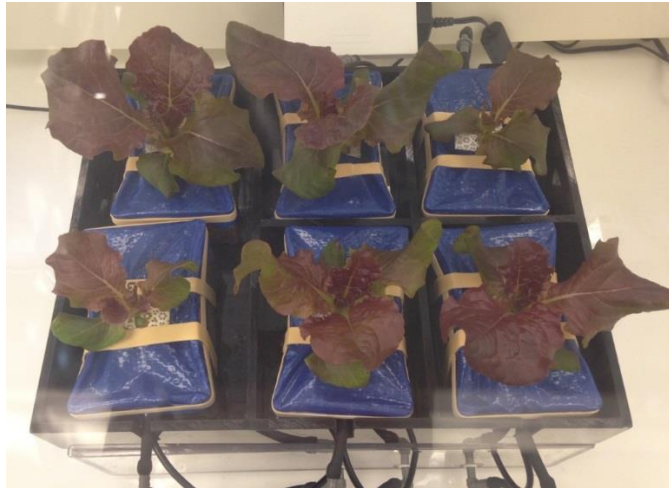
Planting



Chamber Study



Results



Productivity

Germination	- 100%
Head Mass	- 40 g Fresh Weight
Hydroponic	- 80-100 g
Veggie	- 25-30 g
Power Use	- 10 W continuous



Conclusions

- Active system was built and tested
- Issues – handling leaks, refilling water bag
- Performance
 - Higher productivity than Veggie – not optimal
 - Reliable – all plants germinated
 - Crew time - minimal